



AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Urbandale, IA 50322

IOWA DNR Air Construction Permit Application

Form GHG: Project Greenhouse Gas Emission Inventory

Please see instructions on the reverse side

Please attach a copy of your calculations showing how the potential GHG emissions were calculated to this form

Company Name:

Plant Number:

EMISSIONS SUMMARY

| (1) EP ID | (2) EU ID | (3) Source Description | (4) Potential Emission Rate | | | | | |
|-----------------------------|--------------|---------------------------|-----------------------------|-----------------------|------------------------|-------------------------|--------------|--------------|
| | | | CO ₂ (tpy) | CH ₄ (tpy) | N ₂ O (tpy) | SF ₆ (lb/yr) | HFCs (lb/yr) | PFCs (lb/yr) |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| (5) Total Project Emissions | | | | | | | | |

Instructions for Form GHG

This form is designed to provide the review engineer information on total Greenhouse Gas (GHG) emissions for the project and GHG emissions from each emission point in the project. GHG emissions are required to be submitted for the project as of July 1, 2007 per Iowa Code 455B.131 as amended by Senate File 485.

Fill in your company name and plant number.

Notes:

1. This form is required for every construction permit application even if the potential GHG emissions are zero.
2. List **ALL** emission units in the project **including exempt units and other non-permitted emission units** (i.e. natural gas boilers rated less than 10 MMBTU/hr, chillers, small units, etc.). Mobile sources (i.e. trucks, forklifts, cars, etc.) are not required to be listed.
3. Emission units may be grouped into categories (i.e. chillers, space heaters, etc.).
4. If the project is a modification to an emission unit, the facility shall report the total GHG emissions for the unit.
5. If multiple emission units use a common emission point, fill in the emission point ID in column (1). List all emission units involved in column (2) and (3) below that emission point (EP) ID.
6. Calculations showing how the potential GHG emissions were calculated are required to be submitted along with this form.
7. More information concerning GHG emissions, including emission factors, can be found on the Air Quality Bureau website at www.iowacleanair.com and clicking on the Greenhouse Gas Emission symbol or by going directly to the Greenhouse Gas page at <http://www.iowadnr.com/air/prof/ghg/ghg.html>. This site will be updated frequently.

Stack/Vent Emissions Summary:

1. Provide the identification number (EP ID).
2. Provide the emission unit(s) identification number (EU ID).
3. Provide a brief description of the source identified in column (2).
4. Fill in the rate of potential emission in the appropriate units (either **tons per year or pounds per year**) for each pollutant. The following are the GHG emissions that must be accounted:
 - (a) **CO₂**: Carbon dioxide.
 - (b) **CH₄**: Methane.
 - (c) **N₂O**: Nitrous oxide. Also known as dinitrogen oxide or dinitrogen monoxide or laughing gas.
 - (d) **SF₆**: Sulfur hexafluoride.
 - (e) **HFC**: Hydrofluorocarbons.
 - (f) **PFC**: Perfluorocarbons.

Attach a copy of your calculations showing how the potential GHG emissions were calculated to this form. Total HFCs and PFCs are to be listed in Box 4, but the calculations shall separate out the individual HFCs and PFCs.

See Table A for a list of most common greenhouse gases and their chemical formula.
5. Fill in the emission rate sum for each pollutant for all emission units associated with the project.

TABLE A: COMMON GREENHOUSE GASES

| <u>GAS</u> | <u>CHEMICAL FORMULA</u> |
|---------------------------------------|---|
| Carbon dioxide | CO ₂ |
| Methane | CH ₄ |
| Nitrous Oxide | N ₂ O |
| Sulfur hexafluoride | SF ₆ |
| Hydrofluorocarbons: | |
| HFC-23 | CHF ₃ |
| HFC-32 | CH ₂ F ₂ |
| HFC-41 | CH ₃ F |
| HFC-125 | CHF ₂ CF ₃ |
| HFC-134 | CHF ₂ CHF ₂ |
| HFC-134a | CH ₂ FCF ₃ |
| HFC-143 | CHF ₂ CH ₂ F |
| HFC-143a | CH ₃ CF ₃ |
| HFC-152 | CH ₂ FCH ₂ F |
| HFC-152a | CH ₃ CHF ₂ |
| HFC-161 | CH ₃ CH ₂ F |
| HFC-227ea | CF ₃ CHFCF ₃ |
| HFC-236cb | CH ₂ FCF ₂ CF ₃ |
| HFC-236ea | CHF ₂ CHFCF ₃ |
| HFC-236fa | CF ₃ CH ₂ CF ₃ |
| HFC-245ca | CH ₂ FCF ₂ CHF ₂ |
| HFC-245fa | CHF ₂ CH ₂ CF ₃ |
| HFC-265mfc | CF ₃ CH ₂ CF ₂ CH ₃ |
| HFC-365mfc | CH ₃ CF ₂ CH ₂ CF ₃ |
| HFC-43-10mee | CF ₃ CHFCHFCF ₂ CF ₃ |
| Perfluorocarbons: | |
| Perfluoromethane (PFC-14) | CF ₄ |
| Perfluoroethane (PFC-116) | C ₂ F ₆ |
| Perfluoropropane (PFC-218) | C ₃ F ₈ |
| Perfluorobutane (PFC-3-1-10) | C ₄ F ₁₀ |
| Perfluorocyclobutane (PFC-318) | c-C ₄ F ₈ |
| Perfluoropentane (PFC-4-1-12) | C ₅ F ₁₂ |
| Nitrogen Trifluoride | NF ₃ |
| Perfluorohexane (PFC-5-1-14) | C ₆ F ₁₄ |
| (PFC-9-1-18) | C ₁₀ F ₁₈ |
| Trifluoromethyl Sulphur Pentafluoride | SF ₅ CF ₃ |

* Iowa Code 455B.131 as amended by Senate File 485 defines a greenhouse gas as being carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

* This is not an all inclusive list and will be updated periodically.

* The chemical formulas were obtained from the Intergovernmental Panel on Climate Change (IPCC) Working Group 1: The Physical Basis of Climate Change, Section 2: Changes in Atmospheric Constituents and Radiative Forcing

The link is as follows: <http://ipcc-wg1.ucar.edu/wg1/wg1-report.html> (page 84 of 106).